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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,325	01/09/2006	Richard Kretz	039185-2	7825

25570 7590 04/16/2007
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EXAMINER

MCNELIS, KATHLEEN A

ART UNIT	PAPER NUMBER
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1742

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/542,325	Applicant(s) KRETZ ET AL.	
	Examiner Kathleen A. McNelis	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>04/04/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

Claims Status

Claims 1-16 remain for examination wherein claims 5-10 are amended and claims 11-16 are new. Examiner confirmed by telephone on 04/02/2007 with Mr. David Safran that the correct version of the claims is not the most recently submitted (01/09/2006) but rather the version submitted on 07/13/2005.

Examiner's Comments

The term "fused" in the claims has been interpreted as molten and "coagulate" has been interpreted as solidify based and on the specification.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese patent document 01-127631 (JP '631)¹.

With respect to claim 1, JP '631 discloses a process for producing a foamed metal by raising the viscosity of the molten metal under atmospheric pressure, foaming by blowing in a gas, then drawing a vacuum to remove the gas (p. 3, "Means for solving the problem"). In an example, Ca was added to Al, melted in air, foamed by titanium hydride addition the cast, depressurized to fill the mold then cooled to consolidate whereupon the mold was removed from the vacuum chamber (example 1, p. 4).

With respect to claim 6, JP '631 discloses examples (examples 1-3) of foaming aluminum, which is a light metal. In example 2 (p. 4) an Al-4.5Mg alloy (i.e. Mg containing alloy) is foamed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 2, 5, 6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Knott et al. (U.S. PG Pub. 2002/0121157) in view of Japanese patent document 01-127631 (JP '631).

¹ Based on English translation

With respect to claim 1, Knott et al. discloses a method for producing a die-cast metal foam by adding a blowing agent to a metal melt ('157 claim 1) where the mixture of melt and blowing agent is formed before introduction into the die cavity ('157 claim 3), and foaming takes place by the release of gases from the blowing agent in the die cavity (paragraph 0028) and vacuum is used in the die (paragraph 0023).

Knott et al. does not recite that the aluminum is melted under atmospheric pressure.

JP '631 discloses a process for producing a foamed metal by raising the viscosity of the molten metal under atmospheric pressure, foaming by blowing in a gas, then drawing a vacuum to remove the gas (p. 3, "Means for solving the problem"), which produces products of complex shapes and size with homogenous bubble formation (p. 5 "effect of invention"). It would have been obvious to one of ordinary skill in the art at the time the invention was made to melt under atmospheric conditions as taught by JP '631 the metal of Knott et al. since Knott et al. is silent regarding the production of the melt and since JP '631 teaches that conventional melting techniques under atmospheric pressure are suitable for producing foamed metal products desired in Knott et al.

With respect to claims 2 and 5, Knott et al. discloses the use of blowing agents which release gas and are solid at room temperature, including light metal hydrides such as magnesium hydride (paragraph 0033), and teaches that the decomposition temperature should be adapted to the melting temperature of the metal melt such that decomposition commences at over 100 °C and no more than 150 °C higher than the melting temperature of the metal melt (paragraph 0031).

With respect to claim 6, Knott et al. discloses light metal alloys, including magnesium (paragraph 0024).

With respect to claim 8, Knott et al. discloses heating the mold ('157 claim 10).

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Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) in view of Japanese patent document 55-138039 (JP '039)².

JP '631 is applied as discussed above regarding claim 1.

With respect to claim 2, JP '631 does not disclose that the materials introduced are converted into at least one compound before melting, emitting a gas soluble in the fluid metal in the region of and/or over the melting interval of the same.

JP '039 discloses a method of foaming an Al alloy by increasing the viscosity with air prior to adding a synthetic calcium silicate hydrate. The synthetic calcium silicate hydrate changes to calcium carbonate prior to releasing CO₂ in the molten material, so that bubbles are present and porosity is increased in the solidified alloy (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a synthetic calcium silicate hydrate as taught by JP '039 as the Ca additive in JP '631 to increase porosity as taught by JP '039.

With respect to claim 3, both JP '039 (abstract) and JP '631 (discussed above regarding claim 1) disclose blowing gas or gas mixtures.

With respect to claim 4, JP '039 discloses that the synthetic calcium silicate hydrate is added as fine grain material (0.1 to 100 microns) in air (abstract), which is therefore an aerosol.

Claims 5, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) in view of Japanese patent document 55-138039 (JP '039) as applied to claims 2 and 4 and further in view of Malik et al. (1985).

JP '631 in view of JP '039 is applied as discussed above regarding claims 2 and 4.

² Based on English abstract

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JP '631 in view of JP '039 does not disclose the temperature at which calcium carbonate emits gases.

Malik et al. discloses DTG data for pure calcium carbonate indicating that decomposition begins at 710 °C (pp. 533-535, tables 1, II and Fig. 1 curve (i)). The decomposition of calcium carbonate in JP '631 in view of JP '039 would therefore begin at about 710 °C. Since JP '631 in view of JP '039 discloses melting aluminum (melting at about 660 °C) this is within the limit of a maximum of 250 °C or 150 °C above the melting or solidification of the metal.

With respect to claim 12, JP '631 discloses examples (examples 1-3) of foaming aluminum, which is a light metal. In example 2 (p. 4) an Al-4.5Mg alloy (i.e. Mg containing alloy) is foamed.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) or Knott et al. (U.S. PG Pub. 2002/0121157) in view of Japanese patent document 01-127631 (JP '631) as applied to claim 1 and further in view of the ASM Handbook, Vol. 15.

JP '631 or Knott et al. in view of JP '631 is applied as discussed above regarding claim 1.

JP '631 or Knott et al. in view of JP '631 does not disclose a pressure of between 0.03 to 0.2 bar.

The ASM Handbook Vol. 15 teaches that hydrogen is removed from aluminum alloys by degassing (pp. 457-460), where the amount of reduced pressure at a given temperature (Fig. 20) affects the evolution of gas bubbles, resulting in different porosities from specimens with the same amount of gas present (Fig. 19 and p. 457). The pressure (vacuum) is therefore a result effective variable affecting the porosity of the resulting casting, and optimization of such in the process of

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JP '631 or Knott et al. in view of JP '631 would have been obvious to one of ordinary skill in the art at the time the invention was made (see M.P.E.P 2144.05, II, B).

Alternatively, the ASM Handbook Vol. 15 teaches the use of high applied vacuum for casting (p. 11) aluminum alloys wherein the vacuum is used to fill the mold, providing high production rates and product with excellent mechanical properties (pp. 275-277). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use vacuum mold filling as taught by the ASM Handbook in the process of JP '631 or Knott et al. in view of JP '631 to provide high production rates and product with excellent mechanical properties as taught by the ASM Handbook. Optimization of vacuum requirements needed to fill the molds would be a result effective variable, dependent upon mold and gate design (see M.P.E.P 2144.05, II, B) and would have been obvious to one of ordinary skill in the art at the time the invention was made.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) in view of the ASM handbook, Vol. 15.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Knott et al. (U.S. PG Pub. 2002/0121157) in view of the ASM handbook, Vol. 15.

JP '631 or Knott et al. is applied as discussed above regarding claim 1.

JP '631 does not disclose preheating the mold before introduction of the fluid material. JP

'631 or Knott et al. does not disclose insulation of the mold.

The ASM Handbook teaches that preheating greatly increases mold life and that repeated heating and cooling cycles over a wide range of temperatures shorten the mold life (p. 281).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to preheat the mold as taught by the ASM Handbook in the process of JP '631 to increase mold life as taught by the ASM Handbook. Further, insulating to prevent repeated heating and

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cooling cycles over a wide ranges of temperatures in the processes of JP '631 or Knott et al. would have been obvious in view of the ASM teaching that such cycles shorten mold life.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) in view of the ASM Handbook Vol. 2 and ASM Handbook Vol. 15.

JP '631 is applied as set forth above regarding claim 1.

JP '631 does not recite including die-cast scrap into the process.

The ASM Handbook Vol. 2 teaches that recycling aluminum scrap into aluminum processing operations has regulatory and economic advantages (pp. 1205-1260). It would have been obvious to one of ordinary skill in the art at the time the invention was made to recycle scrap as taught by the ASM handbook in the process of JP '631 for the regulatory and economic advantages taught by the ASM Handbook. Although JP '631 in view of the ASM Handbook does not specifically recite the use of dye cast scraps, such would have been obvious in view of die casting alloys of similar composition to that disclosed in examples of JP '631, for example die casting alloys 515 and 516 (Table 1, p. 745, ASM Handbook Vol. 15) containing a similar amount of Mg as the exemplary alloy in JP '631 discussed above.

Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) in view of Japanese patent document 55-138039 (JP '039) and Malik et al. (1985) as applied to claim 12 and further in view of the ASM Handbook, Vol. 15.

JP '631 in view of JP '039 and Malik et al. is applied as discussed above regarding claim 12.

JP '631 in view of JP '039 and Malik et al. does not disclose a vacuum of between 0.03 to 0.2 bar (claim 13) or preheating the mold before introduction of the fluid material or insulation of the mold (claims 14 and 15).

The ASM Handbook Vol. 15 teaches that hydrogen is removed from aluminum alloys by degassing (pp. 457-460), where the amount of reduced pressure at a given temperature (Fig. 20) affects the evolution of gas bubbles, resulting in different porosities from specimens with the same amount of gas present (Fig. 19 and p. 457). The pressure (vacuum) is therefore a result effective variable affecting the porosity of the resulting casting, and optimization of such would have been obvious to one of ordinary skill in the art at the time the invention was made (see M.P.E.P 2144.05, II, B).

Alternatively, the ASM Handbook Vol. 15 teaches the use of high applied vacuum for casting (p. 11) aluminum alloys wherein the vacuum is used to fill the mold, providing high production rates and product with excellent mechanical properties (pp. 275-277). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use vacuum mold filling as taught by the ASM Handbook in the process of JP '631 in view of JP '039 and Malik et al. to provide high production rates and product with excellent mechanical properties as taught by the ASM Handbook. Optimization of vacuum requirements needed to fill the molds would be a result effective variable, dependent upon mold and gate design (see M.P.E.P 2144.05, II, B) and would have been obvious to one of ordinary skill in the art at the time the invention was made.

Further, the ASM Handbook teaches that preheating greatly increases mold life and that repeated heating and cooling cycles over a wide range of temperatures shorten the mold life (p. 281).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to preheat the mold as taught by the ASM Handbook in the process of JP '631 in view of JP '039, Malik et al. to increase mold life as taught by the ASM Handbook. Further, insulating to prevent repeated heating and cooling cycles over a wide ranges of temperatures would have been obvious in view of the ASM teaching that such cycles shorten mold life.

Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-127631 (JP '631) in view of Japanese patent document 55-138039 (JP '039), Malik et al. (1985) and Vol. 15 of the ASM Handbook as applied to claim 15, and further in view of the ASM Handbook Vol. 2.

JP '631 in view of JP '039, Malik et al. and the ASM Handbook Vol. 15 is applied as set forth above regarding claim 13.

JP '631 in view of JP '039, Malik et al. and the ASM Handbook Vol. 15 does not recite intruding die-cast scrap into the process.

The ASM Handbook Vol. 2 teaches that recycling aluminum scrap into aluminum processing operations has regulatory and economic advantages (pp. 1205-1260). It would have been obvious to one of ordinary skill in the art at the time the invention was made to recycle scrap as taught by the ASM Handbook in the process of JP '631 in view of JP '039, Malik et al. and the ASM Handbook for the regulatory and economic advantages taught by the ASM Handbook. Although JP '631 in view of JP '039, Malik et al. and the ASM Handbook does not specifically recite the use of dye cast scraps, such would have been obvious in view of die casting alloys of similar composition to that disclosed in examples of JP '631, for example die casting alloys 515 and 516 (Table 1, p. 745, ASM Handbook Vol. 15) containing a similar amount of Mg as the exemplary alloy in JP '631 discussed above.

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Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Knott et al. (US PG Pub. 2002/0121157) in view Japanese patent document 01-127631 (JP '631) as applied to claim 1 and further in view of Yang et al. (U.S. Pat. No. 5,632,319).

Knott et al. in view of JP '631 is applied as set forth above regarding claim 1.

Knott et al. in view of JP '631 does not disclose using die-cast scrap in the process.

Yang et al. discloses a method of making foamed aluminum materials (abstract) where the waste from the process is beneficially recycled as raw material to the process and aide in achieving the desired viscosity (col. 2 lines 62 – col. 3 line 19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to recycle as taught by Yang et al. the waste from the die casting process of Knott et al. in view of JP '631 as raw material for the process and to aide in achieving the desired viscosity as taught by Yang et al.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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Claims 1, 6, 7 and 10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 3, 5, 9 and 10 of copending Application No. 11/597737. Although the conflicting claims are not identical, they are not patentably distinct from each other because:

With respect to instant claim 1, '737 claim 1 discloses forming light metal parts from recycled gas-containing metal parts where the melt is solidified under vacuum. '737 claim 10 discloses that the melt is produced at atmospheric pressure.

With respect to instant claim 6, '737 claim 5 discloses magnesium.

With respect to instant claim 7, '737 claim 9 discloses 10 to 400 mbars (i.e. 0.01 to 0.4 bar), which overlaps the claimed range of 0.03 to 0.2 bar, therefore a prima facie case of obviousness exists (M.P.E.P § 2144.05).

With respect to instant claim 10, '737 claim 3 discloses recycled die casting scrap.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571 272 3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications

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may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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04/05/2007

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